

1. An isolated protein sequence or peptide from the E2, E6 or E7 early coding region of human papillomavirus (HPV) that is soluble in an aqueous medium, and characterized by a relative paucity of tryptophan, methionine, and cysteine residues, and a relative abundance of glycine and asparagine residues.

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2. The isolated protein sequence or peptide as defined in claim 1, wherein the HPV is selected from the group consisting of 16, 18, 31, 33, 35, 45, 51, 52, 56 and 58.

3. A isolated protein sequence or peptide as defined in claim 1, further comprising one or more additional glycine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

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4. An isolated protein sequence or peptide from HPV for detecting or diagnosing cancer or cellular abnormalities, said isolated protein sequence or peptide selected from the group consisting of:

- an E2 early coding region of HPV 18 as set forth in SEQ. ID. NO.: 1;
- 5 an E2 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 2;
- an E2 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 3;
- an E6 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 4;
- an E6 early coding region of HPV 18 as set forth in SEQ. ID. NO.: 5;
- an E7 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 6;
- 10 an E7 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 7; and
- an E7 early coding region of HPV 18 as set forth in SEQ. ID. NO.: 8.

5. A isolated protein sequence or peptide as defined in claim 4, further comprising one or more additional glycine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

6. The isolated protein sequence or peptide as defined in claim 4, further comprising one or more additional asparagine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

7. The isolated protein sequence or peptide as defined in claim 4, further comprising a combination of glycine and asparagine residues added at a carboxyl terminal residue of said isolated protein sequence of peptide.

8. The isolated protein sequence or peptide as defined in claim 4, wherein the HPV is selected from the group consisting of 31, 33, 35, 45, 51, 52, 56 and 58.

9. An isolated protein sequence or peptide comprising an E2 early coding region of HPV 18 as set forth in SEQ. ID. NO.: 1.

5 10. A isolated protein sequence or peptide as defined in claim 9, further comprising one or more additional glycine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

10 11. The isolated protein sequence or peptide as defined in claim 9, further comprising one or more additional asparagine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

15 12. The isolated protein sequence or peptide as defined in claim 9, further comprising a combination of glycine and asparagine residues added at a carboxyl terminal residue of said isolated protein sequence of peptide.

13. An isolated protein sequence or peptide comprising an E2 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 2.

5 14. A isolated protein sequence or peptide as defined in claim 13, further comprising one or more additional glycine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

10 15. The isolated protein sequence or peptide as defined in claim 13, further comprising one or more additional asparagine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

15 16. The isolated protein sequence or peptide as defined in claim 13, further comprising a combination of glycine and asparagine residues added at a carboxyl terminal residue of said isolated protein sequence of peptide.

17. An isolated protein sequence or peptide comprising an E2 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 3.

5 18. A isolated protein sequence or peptide as defined in claim 17, further comprising one or more additional glycine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

10 19. The isolated protein sequence or peptide as defined in claim 17, further comprising one or more additional asparagine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

15 20. The isolated protein sequence or peptide as defined in claim 17, further comprising a combination of glycine and asparagine residues added at a carboxyl terminal residue of said isolated protein sequence of peptide.

21. An isolated protein sequence or peptide comprising an E6 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 4.

5 22. A isolated protein sequence or peptide as defined in claim 21, further comprising one or more additional glycine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

10 23. The isolated protein sequence or peptide as defined in claim 21, further comprising one or more additional asparagine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

15 24. The isolated protein sequence or peptide as defined in claim 21, further comprising a combination of glycine and asparagine residues added at a carboxyl terminal residue of said isolated protein sequence of peptide.

25. An isolated protein sequence or peptide comprising an E6 early coding region of HPV 18 as set forth in SEQ. ID. NO.: 5.

5 26. A isolated protein sequence or peptide as defined in claim 25, further comprising one or more additional glycine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

10 27. The isolated protein sequence or peptide as defined in claim 25, further comprising one or more additional asparagine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

15 28. The isolated protein sequence or peptide as defined in claim 25, further comprising a combination of glycine and asparagine residues added at a carboxyl terminal residue of said isolated protein sequence of peptide.

29. An isolated protein sequence or peptide comprising an E7 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 6.

5 30. A isolated protein sequence or peptide as defined in claim 29, further comprising one or more additional glycine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

10 31. The isolated protein sequence or peptide as defined in claim 29, further comprising one or more additional asparagine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

15 32. The isolated protein sequence or peptide as defined in claim 29, further comprising a combination of glycine and asparagine residues added at a carboxyl terminal residue of said isolated protein sequence of peptide.



33. An isolated protein sequence or peptide comprising an E7 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 7.

5 34. A isolated protein sequence or peptide as defined in claim 33, further comprising one or more additional glycine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

10 35. The isolated protein sequence or peptide as defined in claim 33, further comprising one or more additional asparagine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

15 36. The isolated protein sequence or peptide as defined in claim 33, further comprising a combination of glycine and asparagine residues added at a carboxyl terminal residue of said isolated protein sequence of peptide.

37. An isolated protein sequence or peptide comprising an E7 early coding region of HPV 18 as set forth in SEQ. ID. NO.: 8.

5 38. A isolated protein sequence or peptide as defined in claim 37, further comprising one or more additional glycine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

10 39. The isolated protein sequence or peptide as defined in claim 37, further comprising one or more additional asparagine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

15 40. The isolated protein sequence or peptide as defined in claim 37, further comprising a combination of glycine and asparagine residues added at a carboxyl terminal residue of said isolated protein sequence of peptide.

41. A method for detecting or diagnosing cancer or cellular abnormalities, said method comprising the steps of:

reacting a sample of body fluid or tissue likely to contain antibodies with one or more protein sequences or peptides isolated from the E2, E6 and E7 early coding regions of human papillomavirus (HPV) selected from the group consisting of an E2 early coding region of HPV 18 as set forth in SEQ. ID. NO.: 1, an E2 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 2, an E2 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 3, an E6 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 4, an E6 early coding region of HPV 18 as set forth in SEQ. ID. NO.: 5, an E7 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 6, an E7 early coding region of HPV 16 as set forth in SEQ. ID. NO.: 7 and an E7 early coding region of HPV 18 as set forth in SEQ. ID. NO.: 8;

forming an antibody-peptide complex comprising at least one of said isolated protein sequences or peptides and said sample antibodies; and

detecting said antibody-peptide complex.

42. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein the HPV is selected from the group consisting of 31, 33, 35, 45, 51, 52, 56 and 58.

43. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said isolated protein sequence or peptide comprises one or more additional glycine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

44. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said isolated protein sequence or peptide comprises one or more additional asparagine residues added at a carboxyl terminal residue of said isolated protein sequence or peptide.

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45. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said isolated protein sequence or peptide comprises a combination of glycine and asparagine residues added at a carboxyl terminal residue of said isolated protein sequence of peptide.

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46. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said cysteine residues of said isolated protein sequence or peptide is substituted with a carboxymethylcysteine residue.

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47. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said diagnostic method is directed to detecting or diagnosing an HPV epitope.

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48. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said HPV epitope is an antigenic region against which antibody reactivity would occur.

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49. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said diagnostic method is directed to detecting or diagnosing an HPV associated cell abnormality.

50. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said diagnostic method is directed to detecting or diagnosing an HPV associated precancerous or premalignant condition.

5 51. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said diagnostic method is directed to detecting or diagnosing an HPV associated cancer.

10 52. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said diagnostic method is directed to detecting or diagnosing cervical dysplasia.

15 53. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said diagnostic method is directed to detecting or diagnosing cervical carcinoma.

20 54. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said diagnostic method is directed to detecting or diagnosing cervical cellular abnormalities selected from the group consisting of koilocytosis, hyperkeratosis, precancerous conditions encompassing intraepithelial lesions, high-grade dysplasias, invasive cancers and malignant cancers.

25 55. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said diagnostic method is directed to detecting or diagnosing adenocarcinoma of the uterine cervix.

56. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said protein sequence or peptide isolated from said HPV E2 coding region comprises detection or diagnosis of an oncoprotein epitope from HPV.

5 57. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said protein sequence or peptide isolated from said HPV E2 coding region comprises detection or diagnosis of premalignant cell transformation, a precancerous condition or cancer.

10 58. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said protein sequence or peptide isolated from said HPV E6 coding region comprises detection or diagnosis of premalignant cell transformation, a precancerous condition or cancer.

15 59. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said protein sequence or peptide isolated from said HPV E7 coding region comprises detection or diagnosis of premalignant cell transformation, a precancerous condition or cancer.

20 60. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said detection step further comprises the step of visually inspecting said antibody-peptide complex for a color change.

25 61. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 41, wherein said detection step further comprises inspecting said antibody-peptide complex for physical-chemical changes.

62. The method for detecting or diagnosing cancer or cellular abnormalities as defined in claim 61, wherein said inspection step further comprises inspecting said antibody-peptide complex using a spectrophotometer.